Water Quality in Ponds for Aquaculture

Claude E. Boyd, Professor
Department of Fisheries and Allied Aquacultures

Alabama Agricultural Experiment Station
Auburn University
Lowell T. Frobish, Director
Auburn University, Alabama

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equilibrates with that of the pond. Then, the animals in the bag can be safely transferred.

TURBIDITY

Turbidity caused by plankton generally is desirable in fish ponds. Troublesome underwater weeds are eliminated by plankton turbidity. Plankton blooms favor greater fish production by stimulating the growth of fish food organisms. Plankton turbidity also improves fishing because the suspended particles limit the vision of fish, making them less wary (Swingle, 1945).

Turbidity resulting from high concentrations of humic substances is not directly harmful to fish, but such waters are usually dystrophic because of acidity, low nutrient levels, and limited light penetration for photosynthesis.

A generally undesirable type of turbidity is that resulting from suspended particles of clay. Wallen (1951) noticed behavioral changes in warmwater fish exposed to clay turbidities greater than 20,000 mg/liter, but individuals of 16 species survived exposure to 100,000 mg/liter of clay turbidity for 1 week. Appreciable mortality occurred at turbidity values above 175,000 mg/liter. Turbidities in natural waters seldom exceed 20,000 mg/liter for more than a few days (Irwin, 1945). Coldwater fish have been killed upon exposure for 3 to 4 weeks to 500 to 1,000 mg/liter of suspended solids, and some streams may maintain suspended solids concentrations above 500 mg/liter for long periods (Alabaster and Lloyd, 1980).

Waters in ponds are comparatively still. This favors sedimentation, and suspended solids seldom exceed 100 or 200 mg/liter for more than a few days. Even though turbidity caused by suspended soil particles will seldom have immediate direct effects on fish in ponds, in the long run it may harm fish populations. Clay turbidity will restrict light penetration, adversely affecting productivity, and some of the particles will settle to the bottom and smother fish eggs and destroy benthic communities. Duchrow and Everhart (1971) pointed out that direct turbidity measurements are of questionable value for establishing water quality standards. The main concern with regard to protection of the aquatic fauna is not the suspended particles (turbidity) *per se*, but the amount of solids in suspension that can potentially settle out (settleable solids).

Buck (1956) divided a series of Oklahoma farm ponds into three categories: clear ponds with average turbidities below 25 mg/liter, intermediate ponds with turbidities from 25 to 100 mg/liter, and muddy ponds with turbidities above 100 mg/liter. The average harvest weights of fish (sunfish and largemouth bass) were: clear ponds, 181 kg/ha; intermediate ponds, 105 kg/ha; and muddy ponds, 33 kg/ha. Differences resulted from greater availability of food